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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JULY 1938

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F. C. McDonough

Fred C. McDonough, field supervisor in insect control, died at the General Hospital in Claremont, N. H., on July 2, 1938, after a short illness. His wife, Lucy O. McDonough, and four children, Esther, Fred, Mary, and John, survive him.

Mr. McDonough was born in Dover, N. H., on July 26, 1889. He enlisted in the 303d Infantry on May 25, 1918, and was transferred to the 18th Infantry on August 1, 1918. He went to France with the latter organization and served in the front lines in the Toule Sector, the St. Mihiel drive, and in the Argonne Forest, where he was gassed. In 1933 he was decorated with the Order of the Purple Heart for wounds received in action.

Mr. McDonough was employed on gypsy moth work under letter of authority from November 16, 1912, to July 15, 1927, war service excluded. He received an appointment as agent on July 16, 1927, and was promoted to field supervisor in insect control on January 1, 1928. He was very active until illness overtook him on June 17, 1938. He was buried with military honors at Newport, N. H., by the American Legion Posts of Newport and Claremont.

FRUIT INSECT INVESTIGATIONS

Distribution and development of overwintering codling moth larvae.--Studies carried on by B. E. Hodgson, of the Vincennes, Ind., laboratory, indicated that in an old orchard where the trees had never been scraped, about 92 percent of the overwintering larvae were on the tree, half of them above 6 feet from the ground. Moths first appeared from the upper parts of the tree. On the average emergence was later from the trunk and lower parts of the tree and emergence in ground cages closely paralleled that from the lower parts of the tree. Thirty ground cages covering a total of about 150 square feet, less than one-fourth the area under the canopy, trapped a total of 246 moths. Approximately three-fourths of these had been added by concentrating coarse surface debris in the cages, but 25 emerged from "aphis roots", 17 from mummied apples, 13 from stubble of underbrush, and 6 from leaves and weed stems.

Codling moths lay most eggs on lower part of tree.--In order to determine where most of the codling moth eggs are laid, E. R. Van Leeuwen, of the Yakima, Wash., laboratory, and his assistants have examined a large number of fruit spurs from unsprayed trees. In one instance, examination was made of about 50 spurs from the upper part and 50 from the lower part of each of 8 trees of 3 varieties. Each spur bore an average of 10 leaves and 1.2 apples. The results of this examination, in terms of total eggs found, were as follows:

Variety	Eggs found		
	Top	Bottom	Total
	Number	Number	Number
Jonathan------	493	608	1,101
Rome---------	485	624	1,109
Winesap-------	283	457	740
Total-------	1,261	1,689	2,950

Fewer eggs were deposited on the Winesap trees, which may in part explain why Winesaps as a rule do not get as wormy as the other two varieties. Contrary to popular belief, more eggs occurred in the lower part of the tree than in the upper.

Survival of imported Japanese beetle parasite.--The Japanese beetle laboratory at Moorestown, N. J., reports having collected a few specimens of Dexia ventralis Ald., an imported dipterous parasite of the Japanese beetle, at the only known colony of this species in this country, the Tavistock golf course in Haddonfield, N. J. This parasite normally has three generations, the second or summer generation emerging in the Japanese beetle area at a time when the population of host larvae is exceedingly low. Because of this situation, only one of the colonies released heretofore has been able to maintain itself, the Tavistock colony, and apparently this colony is barely surviving. However, it has been possible from the very few individuals collected to rear up a fairly large amount of material for further colonization at points where it is hoped conditions will be better adapted for this species, particularly with reference to availability of host larvae for the summer generation. It is hoped to place new colonies in an area where both Popillia japonica Newm. and native Phyllophaga are present at the same time in order to determine whether any of the native species of Phyllophaga will act successfully as an alternate host for the summer generation of this parasite.

Dichlor-ethyl ether for plum curculio control.--Oliver I. Snapp and J. R. Thomson, Jr., of the peach-insect laboratory at Fort Valley, Ga., have completed experiments in cages built over peach trees to obtain data on the effectiveness of dichlor-ethyl ether against the several stages of the plum curculio in the soil under peach-orchard conditions. They report that, although 1,000 plum curculio larvae were placed on the soil under each of these caged trees during the period April 29 to May 2, all peaches produced on these trees and harvested in July were free from curculio larvae as a result of dichlor-ethyl ether at the rate of 10 cc per gallon of water having been used on each square yard of soil against the larvae in 1 cage on May 4 and at the rate of 30 cc per gallon of water on each square yard of soil against the pupae in another cage on May 17. Not a single curculio adult emerged in the cage where the stronger material was used, and only nine adults emerged in the cage where the weaker material was used and these did not cause any wormy peaches.

Flight habits of dermestids.--Beetles of the family Dermestidae are of common occurrence in stored raisins, probably as scavengers. In 1937 Heber C. Donohoe, then of the dried-fruit insect laboratory at Fresno, Calif., found these beetles in raisins to a maximum extent of 900 per ton. Samples taken from March to June contained none, but they were found in samples collected from July to October. Specimens from raisins have included species of Trogoderma, Attagenus, and Perimegatoma, provisionally determined by H. S. Barber. Catches taken in a rotary net operated in a raisin storage yard by Dwight F. Barnes and George H. Kaloostian, of the Fresno laboratory, this year have contained numerous dermestids. From April 14, when the net was started, to July 31 the total was 21,645. The average daily catches were: April, 14; May, 47; June, 127; July, 651. Collections made at intervals of 15 minutes throughout two nights resulted in the capture of small numbers in the early evening of one night. Similar work during daylight hours showed that these insects flew for the most part in bright sunlight. Short-interval catches on 3 days in July contained 474, 669, and 1,597 dermestids. On July 21 a few were taken in the net at an elevation of about 3 feet, when the air temperature was 108° F. in the shade and 110° F. in the sun. In the intervals shown below, the catches on that date were: 6:15 a.m. to 8 a.m., 76; 8:15 a.m. to 10 a.m., 248; 10:15 a.m. to 12 m., 278; 12:15 p.m. to 2 p.m., 59; 2:15 p.m. to 3:30 p.m., 4.

MEXICAN FRUITFLY CONTROL

Still no Mexican fruitfly in the lower Valley.--Exactly the same number of the Mexican fruitflies, namely 66, were trapped in Laredo in July as were taken there in June. Repeated inspections of the limited quantity of pomegranates and late peaches on the trees during this period have failed to uncover a local larval infestation. No other Anastrepha ludens were taken in Texas. In Mexico, however, the number of A. ludens trapped increased slightly in Matamoros to a total of 44, while in Nuevo Laredo 6 adults were taken. Apparently all of these flies emerged in the border cities of Mexico and were trapped there or in Laredo, Tex. No Mexican fruitfly, adults or larvae, could be found in the lower part of the Rio Grande Valley in July. The results of the 403 collections during the month are summarized in the following table.

Species	Texas	Mexico
Adults		
Anastrepha ludens Loew	*66	50
A. serpentina Wied	44	0
A. sp. "L"	46	5
A. sp. not ludens	6	0
A. pallens Coq	470	131
Toxotrypana curvicauda Gerst	2	0
Total	634	186
Larvae		
A. ludens	0	1,003
A. serpentina	0	38
A. mombinpraeoptins Sein	0	53
A. sp. not ludens	0	93
Total	0	1,187
Grand total	634	1,373

*From Laredo, Tex.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Insecticide experiments for control of European corn borer.--On conclusion of his 1938 experiments for insecticidal control of the European corn borer in sweet corn in the Lake States, D. D. Questel, Toledo, Ohio, reports that ground derris (4 lbs. per 100 gals. water) was the outstanding spray used. With this spray, 97.8 percent of the No. 1 ears in the treated plots were borer-free, as compared to 68.4 percent in the nontreated plots, and the borer population in the treated plots was reduced 89.3 percent from that in the nontreated plots. Sprays of synthetic cryolite (1 lb. per 100 gals. water), calcium fluosilicate (2 lbs. per 100 gals. water), and phenothiazine (4 lbs. per 100 gals. water) also gave good control and were about equal in their effectiveness. The first two of these, however, caused severe burning of the corn plants. Both standard nicotine tannate (.0625% nicotine) and Quebracho nicotine tannate (.0625% nicotine) sprays were low in insecticidal performance in the Ohio tests. Among the dusts, synthetic cryolite (20%) gave the best control.

Severe European corn borer infestation in early market sweet corn.--A. M. Vance, Toledo, reports that severe damage was caused by the European corn borer this season to early market sweet corn in several sections of the country, as determined by surveys made late in July. A survey of 25 fields of sweet corn near Toledo showed an average of 1,751 borers per 100 plants, with practically 100 percent of the plants infested. Only 2 of the fields averaged less than 1,000 borers per 100 plants and 6 fields averaged 2,000 or more borers per 100 plants. Infestation of this intensity was reflected in a decreased demand for sweet corn on the part of both merchant and consumer and an appreciable price reduction on the Detroit and Toledo markets. South of Sandusky, Ohio, 8 of the most severely infested fields of sweet corn showed an average of 98 percent plant infestation and 1,128 borers per 100 plants. Surveys of 10 fields of early sweet corn near Cleveland, Ohio, and Detroit, Mich., indicated infestations of but 66 and 285 borers per 100 plants, respectively. In New Haven County, Conn., the corn borer was abundant in early sweet corn, with an average of 878 borers per 100 plants in 25 surveyed fields in which an average of 97 percent of the plants were infested. Infested plants observed during the survey near New Haven contained a minimum of 5 and a maximum of 18 borers per plant. Through cooperation with the Agricultural Experiment Station at Geneva, N. Y., the Bureau has received data on corn borer infestation in market sweet corn in New York State, showing average populations of 624, 403, and 272 borers per 100 plants, respectively, in Albany County (12 fields), Columbia County (8 fields), and Schenectady County (7 fields).

Differentiation between one- and multiple-generation strains of European corn borer.--K. D. Arbuthnot, New Haven, Conn., reports that current laboratory studies on the genetics of the various strains of the European corn borer are characterized by continuation of limitations encountered previously in crosses of New Haven females and Toledo, Ohio, males, no fertile eggs from this cross having been obtained during the current season's observations. The reciprocal cross is made readily and the reaction of the progeny is similar to that of rearings from multiple-generation (New Haven) stock.

Importance of certain sugars and proteins in nutritive requirements of European corn borer.--G. T. Bottger, Toledo, reports that laboratory rearings of corn borer larvae to establish the nutritive effect of certain carbohydrate and protein constituents in their diet indicate clearly that the growth rate of the test larvae was materially increased by the addition of protein and dextrose to the diet. Also, the more readily digestible diets are reflected in more favorable larval responses, particularly in comparison with diets high in cellulose content. Confirmation of these interpretations is found in studies of the enzyme complex of the cellular tissue of the alimentary tract.

Colonization of European corn borer parasites.--W. A. Baker, Toledo, provides the following summary of releases of corn borer parasites in the corn borer infested area of the United States in 1938. Material for field releases was obtained entirely from laboratory breeding programs, except for one small release of *Phaeogenes nigridens* which was made from material imported from Italy late in the summer of 1937 and held over in storage at Moorestown, N. J., to provide optimum synchronization with corn borer pupae at time of field release. The numbers of colonies of imported European corn borer parasites released during the 1938 season were as follows:

State	*Chelonus annulipes* Wesm.	*Microbracon brevicornis* Wesm.	*Phaeogenes nigridens* Wesm.	Total
	Number	Number	Number	Number
Vermont--------	7	--	--	7
Massachusetts--	7	--	--	7
Connecticut----	3	1	--	4
New York-------	1	1	--	2
New Jersey-----	6	2	1	9
Maryland-------	1	1	--	2
Ohio-----------	1	--	--	1
Total------	26	5	1	32

European corn borer parasites in the Eastern States.--C. A. Clark, Moorestown, N. J., reports the completion of emergence in the laboratory from corn borers collected in the field in the fall of 1937 and stored at the Moorestown laboratory until late in the winter. The following species of imported parasites appeared during the rearing program: *Lydella stabulans* var. *grisescens* R. D., *Inareolata punctoria* Roman, *Macrocentrus gifuensis* Ashm., *Chelonus annulipes*, and *Cremastus flavoorbitalis* (Cameron). The data are featured by the general development of parasites in the vicinity of Taunton, Mass., at which point all species given above have been taken, and the rapid build-up of *I. punctoria* in the Hartford, Conn., district. The extent of the distribution of the various parasites is shown in the following table.

Area	Collections made	Collections producing-- *L. grisescens*	*I. punctoria*	*M. gifuensis*	*C. annulipes*	*C. flavo-orbitalis*	*Bassus agilis*	*Labrorychus prismaticus*
	Number	Number	Number	Number	Number	Number	Number	Number
Connecticut:								
East Hartford--	26	10	19	--	0	0	1	0
Massachusetts:								
Maldon----------	33	5	25	0	0	0	0	2
Tauhton---------	96	31	20	15	12	1	6	2
New Jersey:								
Atlantic--------	21	1	1	--	0	0	1	0
Virginia:								
Lee-------------	28	9	0	--	2	0	0	0
Total----------	204	56	65	15	14	1	8	4

Mr. Clark also reports that an adult of *Phaeogenes nigridens* was reared on May 23 from a lot of 82 corn borer pupae collected in Burlington Township, Burlington County, N. J., on May 7, 1938. This parasite represented the first recovery from the release of this species made 17 days earlier at the same location and indicates successful initial establishment.

Laboratory breeding of egg parasite of European corn borer.--W. G. Bradley, Toledo, Ohio, states that following, in general, technic discussed previously in the News Letter (vol. IV, No. 1, pp. 3-4, January 1, 1937), a laboratory breeding program for *Chelonus annulipes* was conducted at Toledo, Ohio, late in the spring and early in the summer for release in the field, principally in the Eastern States areas infested by the corn borer. While preliminary experiments had indicated an expected production rate of 9.5 parasites per 100 eggs of *Ephestia kuehniella* Zell., the host utilized in the breeding program, an average rate of 24.5 was returned. Distribution to the Eastern States was made by railway express in iced insulated boxes, with mortality en route averaging about 1 percent. The increased production also provided adults for test releases against the sugarcane borer in Florida, Louisiana, and Puerto Rico. Various shipping methods were utilized in transporting the adults to these localities, including air express, railway express re-iced en route, and railway express in conjunction with boat to Puerto Rico re-iced at New York. By far the most satisfactory results with long-distance shipments of this species were obtained with the insulated iced boxes, re-iced en route, and using either rail or rail-plus-boat facilities.

A rail shipment to New Orleans averaged less than 1 percent mortality from time of shipment to field release and the rail-boat shipment to Puerto Rico averaged only 2 percent. A total elapsed period of 7 days was required for the Puerto Rico shipment from date of shipment at Toledo to date of release in Puerto Rico. During the program a total of 133,424 Chelonus adults were produced, involving the handling of over half a million host eggs.

Abnormal weather prolongs hatching period of grasshopper eggs in California.--C. C. Wilson, Sacramento, Calif., reports that rainfall above normal and mean temperatures below normal during the latter part of the winter and early in the spring have prolonged the grasshopper egg hatch over a period of approximately 75 days, or from April 1 to June 16. The normal hatch usually reaches its peak by May 10, particularly in alfalfa fields in the Sacramento Valley. In San Luis Obispo County the eggs hatch normally from March 15 to April 15, the peak of oviposition occurring usually around June 10, whereas in 1938 from April 15 to June 10 the hoppers were largely in the first to the fourth instars. The eggs of Melanoplus devastator Scudd. in the grazing land of the foothills began to hatch 2 weeks later than normal and continued to hatch through May 25. The long hatching period this season is largely due to excess moisture in the soil and to a luxuriant growth of vegetation, which tended to hold the soil temperature below the optimum for hatching. The stages of development of the economic species in California (June 1-18, 1938) are given in detail in the following table.

County (California)	Date	Species	Stage of development					
			First instar	Second instar	Third instar	Fourth instar	Fifth instar	Adult
	June							
Sacramento--	2-16	Melanoplus marginatus Scudd.	218	183	101	86	2	1
		M. femur-rubrum Deg.	83	127	37	9	--	--
	26	M. devastator	7	116	168	112	30	--
San Luis Obispo--	12-18	Camnula pellucida Scudd.	49	92	121	130	23	8
		M. devastator	428	297	62	8	--	--
Other counties*	1-15	M. devastator	1	47	86	192	147	72
		Oêdaleonotus enigma Scudd.	--	--	--	4	1	89

*Specimens collected in Los Angeles, Kern, Merced, Stanislaus, Mariposa, Calavera, San Joaquin, Placer, Yuba, Sutter, Butte, and Glenn Counties.

Sugarcane borer more abundant in corn adjoining rice fields.--W. A. Douglas, Crowley, La., examined corn for comparison of injury by Diatraea saccharalis (F.) in 10 representative fields adjacent to rice and in 10 fields within a 10-mile zone of the rice area but where no rice was grown. Examinations consisted of dissecting 25 practically mature representative stalks from each field. Findings were as follows:

Location	Stalks		Larvae	Pupae	Pupal skins	Total stages
	Total	Bored				
	Number	Number	Number	Number	Number	Number
Corn adjacent to rice fields	250	230	291	315	171	777
Corn at least 1 mile from rice fields	250	119	101	84	26	211

Oviposition of Phyllophaga in various crops.--T. R. Chamberlin and Lee Seaton, reporting on studies of grub populations from 1938 oviposition in various crops on the Crowley Farm, near Lamont, Wis., submit the following data. Holes dug were of 1/40,000-acre area.

Crop	Holes dug	Mean population per 1/40,000 acre
	Number	
(1) Pasture (bluegrass)	17	1.94
(2) Pasture (bluegrass)	15	5.4
(3) Sweet clover and Junegrass	16	1.19
(4) Corn	12	0
(5) Oats	15	.66
(6) Junegrass, alfalfa, and red clover	20	1.8
(7) Corn	15	0
(8) Oats	15	.266
Total	125	--

Since the population consisted of eggs and first-instar larvae which had moved but little, a wide range in population in various holes occurred. Except in (2) a pasture, the populations are very low, especially since the fields were in the midst of woods, the beetle population was heavy, and the soil was in good condition for oviposition, hatching of eggs, and development of grubs. It will be noted in (3) that the presence of sweetclover did not prevent oviposition in the field of sweetclover and junegrass and in (6) that the presence of red clover and alfalfa did not prevent oviposition in the field of junegrass, red clover, and alfalfa. No oviposition appears to have taken place in the clean-cultivated corn.

JAPANESE BEETLE CONTROL

First-record Dutch elm disease infections in New Jersey.--Positive culture of twig samples from an elm in Kingwood Township, Hunterdon County, N. J., added 35 square miles to the infected zone in that State. This latter infection, plus previously confirmed trees found in Delaware Township in April and in West Amwell Township in June of this year, extends the infected zone to include this entire county. Other first-record infections reported in New Jersey during the month occurred in Ewing and Lawrence Townships, Mercer County, and in Blairstown Township, Warren County. At the end of the month the total work area in New Jersey was 3,837.64 square miles, 3,126 of which were in the infected zone and 711.64 in the 10-mile protective strip. In the past year 155.30 square miles has been added to the New Jersey infected zone.

Dutch elm disease concentration in New Jersey infected zone.--A severe concentration of Dutch elm disease within the known infected zone has developed in the Sourland Mountain region of Mercer, Hunterdon, and Somerset Counties, N. J. In an area approximately 500 feet square in Hillsborough Township, Somerset County, 28 twig samples showing characteristic discoloration were taken from 30 elms sampled early in the month. One tree sampled by the scouts was so badly attacked by bark beetles that approximately 80 percent of the twigs were broken and hanging. The wilt from the infection, plus the wilted, dangling twigs resulting from crotch feeding by the beetles, made the tree appear as though it had a severe infection of fire blight.

Scouting at Indianapolis.--The first systematic survey was completed at Indianapolis on July 23, and the second going-over was started in the center of the infected zone on July 25. Early in the month the State of Indiana furnished one of the crews with an 18-foot boat having a 4½ horse-power motor to enable the crew to scout along the White River from the Marion County line southwestward to the Wabash River. All elms within 500 to 1,000 feet of the river's edge were examined. The crew progressed much faster than would have been possible by foot or automobile scouting. Crews in boats also scouted along the Wabash River to the junction of the Ohio River. A large island at the junction of the rivers was also surveyed for diseased elms.

Northward extension of Dutch elm disease zone.--Continued scouting in the general region where diseased elms were found in the towns of Fishkill, Hyde Park, and Poughkeepsie, Dutchess County, N. Y., resulted in a further discovery of two infected trees in the town of Washington. One of these was in the village of Millbrook. These are the first finds in the tri-State infected area to extend the range of infection outside the area within a 60-mile radius of New York City. It constitutes a northward spread of the disease for approximately 27 miles beyond the former boundary of the infected zone. The confirmations in the town of Washington are within 22 miles of the southwestern boundary of Massachusetts.

Increased confirmations indicated in New Jersey.--Field surveys in New Jersey during the month revealed a large number of elms showing flagging in areas that have not yet been systematically scouted. Consequently, a large increase in the number of confirmations may be expected, in comparison with previous years. There is also a tremendous increase in the numbers of Scolytus multistriatus Marsh. and Hylurgopinus rufipes Eich. to be found invading any suitable elm material, either cut or standing. A total of 1,374 confirmations reported by the laboratory for the week ended July 23 constituted an all-time record for a single week's confirmations in the State.

Dutch elm disease discovered in Pennsylvania.--Confirmation of two elms in Pennsylvania marked the discovery of the disease in another State. Recollections of twig samples from the two trees suspected of containing infections were positively confirmed late in the month, and an eradication crew started removing one of the trees. The first tree found, of 42 inches DBH, overhangs the Delaware River on a property in Upper Mount Bethel Township, Northampton County. The second confirmation is located approximately 3½ miles from the other infection, near Bangor.

Elm-sanitation project at West Point.--Starting in mid-July, the Forestry Department of the U. S. Military Academy started a project to prune all elms of value on the developed section of the reservation. Other elms of little or no value and in decadent condition are being removed and burned. The climbers and ground men engaged in the work are C. C. C. enrollees from a camp at Cornwall, N. Y. The foremen were formerly employed by this Division and are experienced in both scouting and eradication activities.

Two additional confirmations at Athens, Ohio.--Second and third confirmations for the current season were reported from the Athens, Ohio, area. Approximately 60 percent of the Athens area had been scouted by the end of the month. Scouting along the Baltimore & Ohio Railroad from Athens to Parkersburg, W. Va., had been completed and the crew returned to Athens.

Centers for refrigerator-car fumigation against Japanese beetle.--Fumigation by methyl bromide and hydrocyanic acid of refrigerator cars transporting fruits and vegetables from the densely infested Japanese beetle area to nonquarantined States was performed at a number of transfer points in Virginia, Delaware, Pennsylvania, New Jersey, and New York. One hundred and seventy-five cars of white potatoes destined for the South were fumigated with methyl bromide during the month at Cape Charles, Va., on the Eastern Shore. At Onley and Melfa, Va., a total of nine cars of onions was certified after experimental fumigation with methyl bromide by the Division of Control Investigations. The greater part of the potato crop from the Eastern Shores of Maryland and Virginia was fumigated with methyl bromide at the Pennsylvania Railroad yards just north of Wilmington. Also treated at this point with the same fumigant were 31 cars of onions and 8 cars of green wrapped tomatoes. In Philadelphia 298 carloads of white potatoes were fumigated with methyl bromide. Eight carloads of white potatoes were fumigated with methyl bromide at Lancaster, Pa., and 17 cars of the same commodity were fumigated with hydrocyanic acid gas at Sinking Springs, Pa. Eight inspectors were necessary at times to fumigate empty cars and inspect screens at the Philadelphia banana piers. In New Jersey empty refrigerator cars were fumigated with hydrocyanic acid gas at Camden, Bridgeton Junction, and Trenton. Carloads of potatoes and onions were also gassed with HCN at Bridgeton Junction, N. J. This year's heavy flight of beetles in New York City made it necessary for the first time to fumigate refrigerator cars loaded with bananas. From the 12th to the 31st of July, 503 loaded cars were fumigated, and 1,021 empty cars were fumigated before loading with bananas. Most of these cars were fumigated in the various railroad yards on the New Jersey side of the Hudson before lightering across on barges for loading at the sides of the banana barges.

Japanese beetles invade Broadway.--Much of this year's Japanese beetle newspaper publicity throughout the country was occasioned by a repetition, on a larger scale, of last summer's beetle invasion of New York City. Swarming beetles, probably from Staten Island, Brooklyn, and other heavily infested areas in nearby New Jersey, rode favoring winds into the business and theatrical districts of Manhattan. In numbers and obnoxiousness, the adults approached the nuisance stage that was experienced in Philadelphia for the decade 1924 to 1934.

FOREST INSECT INVESTIGATIONS

Spruce budworm increases in Colorado.--Donald DeLeon, Fort Collins, Colo., reports that the outbreak of Cacoecia fumiferana (Clem.) on ponderosa pine in the areas near Boulder and Bergen Park has increased in intensity and extent during the past season. In addition to these areas, it has also been found on the Montezuma, San Juan, and Pike National Forests and on other parts of the Roosevelt National Forest, Colo. Heavy outbreaks of the moth were also found this year in the Douglas fir stands in localized areas on the Roosevelt and Medicine Bow National Forests. There are apparently two races of the moth, as those on Douglas fir are not only much darker than those on ponderosa pine but also do not attack ponderosa pine in the Douglas fir stands, nor does the moth in ponderosa pine attack the Douglas fir growing in association with it, although it has been found to attack limber pine. The flight of the race on Douglas fir occurs from 2 to 3 weeks earlier than the flight of the race on ponderosa pine.

Penetrating sprays for control of mountain pine beetle in lodgepole pine.--A. L. Gibson, Coeur d'Alene, Idaho, again reports success in the experimental use of penetrating sprays as a means of controlling the mountain pine beetle in lodgepole pine. These sprays, which are applied to the infested portion of the bole, penetrate the bark and destroy the insect broods beneath. Three formulas having orthodichlorobenzene and naphthalene as the lethal agent all gave successful results. This season's experiments were conducted on the Grand Teton National Park where a rather large series of trees was treated with the various formulas being tested. It is believed that this method of control will supplant the use of fire, as it offers an effective and economical method of destroying broods of the mountain pine beetle in lodgepole pine. There are, however, certain details in connection with the administration of the method in the field which will need to be developed.

Pine beetle survey gets under way.--For the last several years this Bureau, the Forest Service, and the Office of Indian Affairs have combined forces to make a thorough survey of bark-beetle activity in the ponderosa pine forests of Oregon and Washington. F. P. Keen, of the Portland, Oreg., laboratory, reports that on July 23 of this year, after a 15-day training period, five crews of three men each were placed in the field to cover the more important national forest and private timberland areas. Additional crews were organized by the Indian Service to cover three of the large Indian reservations of the region. In addition to making a 100-percent check of current bark-beetle damage on more than 200 permanent 320-acre sample plots, a large number of 1-acre plots will also be cruised to determine the conditions most frequently leading to bark-beetle damage. General scouting work will also be done to observe conditions on some 15,000,000 acres of ponderosa pine forests in the two States. It is expected that the major part of the survey work will be completed by the end of September and areas needing control can be designated by that time.

Observations on carpenter ants in the Northwest.--Experimental control of carpenter ants in Oregon and Washington has disclosed that at least three species--Camponotus herculeanus L., C. maculatus F., and C. laevigatus Smith--establish colonies in houses in this region, according to R. L. Furniss, Portland, Oreg. Present data show that the first two are much more prevalent than is C. laevigatus in the vicinity of Portland. Houses of poor construction--that is, with wood in contact with ground--are more likely to be attacked than houses of good construction. The ants are frequently associated with rot, but there are many exceptions to this rule. In one case a large colony moved into the attic of a house before the owner moved in. Camponotus has been noted tending aphids on Pseudotsuga, Abies, Thuja, and Paeonia.

Several species of sawflies observed in Minnesota.--H. J. MacAloney, Milwaukee, Wis., reports that during July four species of sawflies were collected from jack pine in the Chippewa and Superior National Forests in Minnesota. On the Chippewa forest, sawfly defoliation in conjunction with spruce budworm defoliation has caused almost complete stripping in one area, and plans are already under way to cut the dying trees this winter. Four species of sawflies have also been found on black and white spruce in Minnesota, with Pikonema alaskensis (Rohwer) (frequently misidentified as Pachynematus ocreatus Harrington) most numerous. Except in isolated instances, defoliation has not been severe. Balsam fir has also been fed on by two of the species collected from black spruce.

Activity of hemlock borer.--H. C. Secrest, Milwaukee, Wis., has found that the adults of the hemlock borer do not become active until the air temperature reaches 70° F. This is usually around 10 a.m., at which time on warm, sunny days the bark temperature on the south side may be 80°. Oviposition was observed between bark temperatures of 80° and 95°, with the optimum about 86°. These temperatures are found in the open stands caused by blow-downs and logging more commonly than in the uncut areas. Beetle emergence had decreased noticeably by the middle of July, and at that time larvae up to 1/2 inch in length were common. Trees heavily attacked in June are now showing yellow foliage and will be dead before fall.

Parasites liberated for control of European spruce sawfly.--P. B. Dowden, P. A. Berry, and F. E. Miller, Jr. (collaborator), of the New Haven, Conn., laboratory, report as follows on the European spruce sawfly and its parasites: "In southern Vermont and New Hampshire a high percentage of first-generation larvae of the spruce sawfly had spun cocoons by July 15. The following week was very rainy and warm and large numbers of the remaining larvae were killed by disease. On July 27 first-generation adults were issuing in large numbers, and samples of cocoons brought into the laboratory indicate there will be little "hold over" in this generation. First-instar larvae of the second generation were common on July 27. In the Wilmington, Vt., area several trees were completely defoliated by the first-generation larvae, and a number of trees were observed that were already attacked by secondary bark beetles. In the spruce sawfly survey 24 New Hampshire towns and 38 Vermont towns have been covered. Thus far heavy infestations have been found only in towns in the vicinity of Wilmington, Vt., and Dublin, N. H., where severe infestations were located in 1937. Microplectron fuscipennis Zett. has been colonized in all suitable infestations. Twelve colonies totaling 120,000 have been liberated in Vermont and 20 colonies totaling 200,000 have been liberated in New Hampshire. Approximately 4 million Microplectron larvae have been produced in the laboratory and are being held at temperatures to retard further development until suitable liberation points are found. On July 8 a shipment of Exenterus abruptorius Thunb., larval parasite, was received from the Canadian Parasite Laboratory. Two colonies totaling about 6,000 adults were liberated in each of the following towns: Wilmington and Lincoln, Vt., and Dublin and Temple, N. H.

Matsucoccus scale tested on possible pine hosts.--Examination of *Matsucoccus* placed on red, white, mugho, Scotch, and Austrian pines indicates that the only species other than pitch pine on which the insect may survive here in the Northeast is red pine, according to T. J. Parr, New Haven, Conn. Several thousand eggs were placed on red pine and all had hatched by May 23. Of these, many were dead by June 24 but on July 15 some of the insects were apparently still alive and the twigs showed typical injury. Injured areas on pitch pine twigs in which enzyme injections were made continue to enlarge. Enzyme injections are being continued.

Elms cut at different seasons exposed to bark beetles.--T. H. Jones and R. T. Webber, of the Morristown, N. J., laboratory, report on an experiment in which small elm logs cut at monthly intervals were later exposed to bark-beetle attack in the field. The first cutting of logs was made in October 1937 and the last in June 1938, just before the logs were put out in an area where elm bark beetles were abundant. Half of each cutting was placed under cover in a wooden building immediately after the logs were cut and the other half in an outdoor cage, the top and sides of which were covered with 30-mesh copper screening. The logs remained in these locations until they were placed in the field. After a month's exposure they were debarked and the galleries counted. Except for logs cut in October, neither the length of time logs were kept before exposure nor the place where they were stored had any appreciable effect on the extent to which they were attacked by the smaller European elm bark beetle (*Scolytus multistriatus* Marsh.). Logs cut in October were apparently becoming too old for attack. The place of storage had a marked effect on the extent to which the logs were attacked by the native elm bark beetle (*Hylurgopinus rufipes* Eich.). There was little attack on the logs kept in the wooden building. Of the logs kept in the cage, those cut in October were most heavily attacked by *H. rufipes*, followed in order by those cut in November and December. Those cut in later months showed noticeably less attack by this species.

Determining point of Dutch elm infection difficult.--When elm trees affected by the Dutch elm disease are cut down and examined it frequently happens that the way in which the fungus that causes the disease entered the tree is not determined. This is probably usually due to the difficulty of minutely examining all parts of the tree, particularly in the case of large trees. Recent observations made by R. T. Webber, of the Morristown, N. J., laboratory, illustrate this fact. The observations further indicate that bark-beetle adults penetrate the bark of healthy elm trees more commonly than has been suspected. Eighteen normal elm trees, averaging 5½ inches DBH, were felled from July 9 to July 18. After they were felled the trunks were carefully debarked and examined. Mr. Webber found 55 places on the trees where bark-beetle adults had bored through the bark and contacted the xylem, presumably in unsuccessful efforts to form egg galleries. He decided that 18 of the contacts had been made by adults of the native elm bark beetle (*H. rufipes*) and 15 by adults of the smaller European bark beetle (*S. multistriatus*). It was not possible to determine which of the two species had made the remaining contacts. Had some of the beetles that made the contacts been contaminated with the fungus a tree might have become diseased later. If it

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were then examined in an effort to determine how it became inoculated it might have been necessary to entirely debark and very carefully examine the entire surface in order to determine the point of inoculation.

Ambrosia beetle a possible vector of Dutch elm disease.--W. D. Buchanan, of the Morristown laboratory, reports that he has found coremia of the Dutch elm disease fungus (Ceratostomella ulmi) in inhabited brood chambers of the introduced ambrosia beetle Xylosandrus germanus. These brood chambers were present in the trunk of a dead elm tree. This is the first record the laboratory has of the occurrence of the fungus in the galleries of this beetle. Obviously, adults emerging from galleries in which coremia are present will be contaminated with the spores of the fungus and will introduce them into other dead wood which they may later attack.

GYPSY AND BROWN-TAIL MOTH CONTROL

W. P. A. gypsy moth field work temporarily suspended.--All W. P. A. gypsy moth field work supervised by the Federal Gypsy Moth Office in Greenfield, Mass., was temporarily suspended on June 30, as no funds were immediately available after the close of the fiscal year. Later in the month approval was received for the employment of a total of 1,006 workers on Federal W. P. A. gypsy moth projects during the month of July.

W. P. A. gypsy moth activities in July.--When the gypsy moth spraying season was concluded at the end of June, and after the temporary suspension of gypsy moth work because of lack of funds, W. P. A. crews were returned to the regular scouting, thinning, and cleaning work; to the inspecting and repairing of temporary fences erected around sprayed areas to exclude livestock; and to certain special work peculiar to this season. Patrolling burlap bands placed around trees as a shelter for gypsy moth caterpillars and crushing all caterpillars and pupae found was a major activity in many areas. Slightly more than 2,100 assembling cages were distributed in 31 townships in Luzerne, Carbon, Monroe, Wayne, and Lackawanna Counties in Pennsylvania, and they are being visited regularly for inspection and to comb the tanglefoot so that it will remain sticky. These assembling cages are arrangements of boards covered with tanglefoot that catch male gypsy moths attracted to them by a bait composed of the ends of the abdomens of female gypsy moths preserved from the previous year in a solution. The collection and preparation of attractant material for next year's assembling cage work was started at Greenfield, Mass., immediately after July 4, and by July 23 sufficient material had been collected for approximately 5,000 cages. It was anticipated that a substantial amount of additional material would be collected before the close of the pupal season. The men employed in patrolling burlap bands, setting out and tending assembling cages, and collecting assembling-cage material will be returned to scouting and other usual work after the close of the pupal and moth seasons.

Gypsy moth larvae found near barrier zone in Vermont.--Two gypsy moth larvae were found during the first week in July by men patrolling burlap bands in Shrewsbury, Vt. During the following week two larvae were discovered at burlap bands in the adjoining town of Mount Holly. The two towns are located east of and in close proximity to a section of the barrier zone where no gypsy moth infestations are known to exist at present. The infestations where the bands were placed were discovered during the fiscal year

1938, and every effort is being made to eradicate them and remove the threat to the nearby section of the barrier zone.

Tanglefoot at gypsy moth assembling cages eaten by bears.--In putting out assembling cages in Kidder Township, Pa., in the heart of the Pocono Mountain area, several cages were nailed to the same trees that had been used in previous years. In two instances it was found that the old tanglefoot used in surrounding the cages had been eaten by bears. They had also eaten the bark from the sections of the trees that had been covered with tanglefoot.

C. C. C. gypsy moth work in July.--The transfer of large numbers of C. C. C. enrollees from eastern camps to camps in the west, the enrollment of new men to take their places, the taking of annual leave by many of the men, and the turning over to the army of many others for dental work caused a reduction in C. C. C. gypsy moth work in July. The new men were employed largely in thinning operations, burning brush, and patrolling burlap bands, which does not require a great deal of training. More time will be lost later when the new men are receiving the special training needed for efficient scouting work. New egg clusters were reported by the men patrolling the burlap bands about the middle of July, and by the end of the third week in July more than 11,500 new gypsy moth egg clusters had been creosoted by the C. C. C. band patrols, principally in the heavily infested town of Russell, Mass.

Gypsy moth infestation is light in two areas treated silviculturally.--Inspection of the area known as "Filter Hill" in Greenfield, Mass., which had been thinned by C. C. C. enrollees according to the latest silvicultural methods, disclosed a very light infestation of gypsy moth caterpillars and no appreciable defoliation. At the State Forest in Wendell, Mass., which was also treated silviculturally, there was slightly more infestation than in the Greenfield area. No spots in the Wendell forest appeared to be more than 25-percent defoliated, the defoliation being much less in most cases. In both areas the species of trees most favored as food by the gypsy moth caterpillars were removed and the growth of less favored species was encouraged, in order to develop stands of more valuable and more gypsy-moth-resistant trees.

PLANT DISEASE CONTROL

Berberis canadensis found in Illinois.--An area infested with Berberis canadensis has recently been located in Pembroke Township, Kankakee County, Ill., according to a report recently received from R. W. Bills. This infestation extends over an area approximately half a mile long and quarter of a mile wide. Only one other area infested with B. canadensis has been found in Illinois, and so far field men have been unable to determine the source of the original bushes. The infested area was treated with salt brine, using 80 pounds of salt to 30 gallons of water per square rod.

Preliminary report on spread of stem rust from South.--Examination of slides that have been exposed this year in connection with the rust-epidemiology studies is about two-thirds completed. So far, over a thousand slides have been examined for stem rust spores, leaving nearly 450 slides yet to be done. In examining slides for stem rust, it was observed that leaf rust spores began to appear early this year on slides exposed in Missouri and Nebraska, that the number of leaf rust spores was high, and that they were present on most days; so it is readily understandable that wheat in these States and farther south suffered an extremely heavy epidemic, which resulted in early killing of the leaves. Stem rust, on the other hand, did not appear as early in May this year as in previous years (1935-37). The first stem rust spores appeared 3 weeks later at some of the stations this year than last. In June more of the slides exposed in the spring-wheat States bore stem rust in 1938 than in previous years--although the spores did not always appear in large numbers, the total was probably higher in 1938. The maximum number of stem rust spores found on any one slide thus far examined is 263,808 per square foot, trapped on June 13 at California, Mo. The next largest number was 197,040 per square foot, found on a slide exposed at Lincoln, Nebr., on June 29. It will be recalled that more than a million spores per square foot were caught on some slides exposed in June 1935. In the physiologic-race identification of 248 uredial isolates made so far this year from northern Mexico, Texas, Oklahoma, Kansas, and Missouri, race 56 continues to be the most prevalent in the United States. This race, which attacks most of the winter wheats and the susceptible spring wheats, comprised only 19 percent of the isolates from northern Mexico. In Texas race 56 comprised 61 percent of the isolates, in Oklahoma 82 percent, in Kansas 81 percent, and in Missouri 73 percent. Race 56 does not attack the more commonly grown durum varieties. Of the races that do attack the durums, 38, 19, and 17 are the most common this year. Races that attack the durums comprised 53 percent of the isolates from Mexico, but in the United States they have been much less common, comprising 33 percent of the isolates from Texas, and only 18 to 20 percent of the races identified from Oklahoma, Kansas, and Missouri. This distribution of races explains why Ceres, Marquis, and Reward have been so heavily attacked in the spring wheat area this year, while the durums have not been so severely rusted. Race 56 is especially virulent on Ceres, among the susceptible spring wheats. Isolates from barberry collections have again this year yielded races that are not commonly found in uredial collections. Such races as 14, 15, 24, 35, 52, 53, 69, 80, 97, and 160 have been isolated; only one of these, race 15, has also been isolated from uredial collections.

Yield from farm woodlot shows value of protection against blister rust.--In 1919 a Minnesota farmer was visited by a member of the Minnesota Forest Service with the object of convincing the farmer, and other local residents, that it was worthwhile to protect the second-growth white pine on their lands against blister rust infection. Although when first approached the farmer was not interested, inasmuch as he could see no income from the woodlot and had planned to cut and grub all the trees so that he could plow the land, he was finally convinced by the forester that the woodlot should be saved. Years passed, and again in 1935 a blister rust crew appeared on the farm. This time no argument was required to prove the value of the woodlot as it was now considered the most valuable part of his farm. During the preceding winter the farmer had harvested about half of the timber from the woodlot. The cut yielded a total of 55,327 board feet. Of this cut, part was sold to a portable saw mill for $16.50 per thousand, delivered on a landing in the woods. Part was sold at $25.50 which included $4.50 per thousand for sawing, and the owner still has 2,350 feet for his own use, which he values at $20.00 per M. In addition, several loads of slashing were disposed of for firewood at $1.00 per load. This brought the total reported return to $955.69, or $477.84 per acre. A check showed the average age of the trees cut to be 51 years, making the yearly yield per acre $9.37. In the words of the owner, this was a far better yield than he could get from his potato crop, and that from land considered worthless. Within another 10 years a similar cut can be made yielding at least as much lumber. In the meantime reproduction is coming in at the rate of 378 trees per acre.

Famous white pines.--In "Famous Trees" of the United States (Misc. Pub. 295), recently issued by the Department, are found seven references to white pines famous for their unusual size, age, or association with notable persons, events, or places.

Phenological notes from lower Michigan.--Infection on *Ribes* is not nearly so extensive as it was a year ago. In the sections where pine infection is heavy, the infection on *Ribes* is very intense. This is especially true in the Leelanau and Newaygo areas, where from 60 to 75 percent of the *Ribes* eradicated were found infected. In one spot in Leelanau County 185 bushes out of 187 pulled were found heavily infected. Species of *Ribes* infected are *R. cynosbati*, *R. hudsonianum*, *R. glandulosum*, and *R. odoratum*. Heavy infection was also noted on *R. cynosbati* and *R. glandulosum* in Grand Traverse County. A number of leaves inspected during the week ending July 9 showed both the uredinial and telial stages.

COTTON INSECT INVESTIGATIONS

Notes on Epicaerus formidolosus Boh.--C. S. Rude and L. C. Fife, Gainesville, Fla., report that at a few places during July the cotton leaves were "ragged" by the weevil *Epicaerus formidolosus* Boh. When these leaves were first noticed it was thought that the injury had been caused by lepidopterous larvae but when the beetles were placed on cotton in a cage it was found that they were causing this damage. In cages the beetles also fed on the tips of the cotton squares causing the tips to flare open. These squares are not shed by the plant but when they open they make an imperfect bloom. This insect seems to be quite resistant to calcium arsenate as no dead weevils were found where the cotton had been dusted and they seemed to be just as numerous in plots that had been dusted as in those not treated. In no case did these weevils damage cotton enough to cause alarm. These notes are recorded because it is thought that this insect has not previously been reported from cotton. The first specimens were submitted on June 8 for determination by L. L. Buchanan. In some fields it was estimated that they occurred in June at the rate of about 1,000 per acre. They were not found on any other plant but cotton.

Insecticide tests.--W. T. Hunt and O. T. Robertson, Presidio, Tex., report results observed by August 1, 1938, of the application of insecticides. In one test no pink bollworm infestation counts had been made but, as there was a serious infestation of the bollworm (*Heliothis obsoleta* F.) in these plots, mature bolls were examined for bollworm injury that showed infestations as follows: Untreated check, 38 percent; paris green plot, 21.5 percent; calcium arsenate and sulphur mixture, 20.5 percent; syncrolite, 11.5 percent; and calcium arsenate, 10 percent. In another test after the plots had been dusted four times an examination of the bolls for pink bollworms gave the following results:

Treatment	Bolls infested	Larvae per boll	Control
	Percent	Number	Percent
Alorco dusting cryolite--	30	0.60	54
Barium fluosilicate------	44	.71	46
Syncrolite---------------	46	.98	25
Alorco cryolite----------	43	1.12	15
Check--------------------	61	1.31	--

Pink bollworm survives winter in El Paso Valley.--H. S. Cavitt and O. T. Robertson, of the Presidio, Tex., laboratory, searched for pink bollworms in the lower El Paso Valley on July 5, 6, and 7, as the occurrence of worms in the early cotton blooms would be evidence that the pink bollworm had overwintered in the soil. Many cotton fields were examined in Hudspeth County as far north as McNary, with negative results in all but two. On July 6 one injured bloom was found near Esperanza, but the larva had fed out and dropped to the ground. This bloom was found in the afternoon and often the fourth-instar larvae leave the "rosette" blooms and enter the soil by that time of day. On July 7 one fourth-instar larva was taken from a "rosette" bloom on the J. H. Neely farm, near Fort Quitman. This finding is excellent evidence that the pink bollworm survived the winter of 1937-38 in the lower part of the El Paso Valley in Hudspeth County, Tex.

Pink bollworms probably did not survive winter in Balmorhea Valley.--Messrs. Cavitt and Robertson searched for pink bollworms in the Balmorhea Valley in Reeves County on July 8, 9, 14, 15, and 16, with negative results. This failure to find a single pink bollworm during 5 days of intensive examination of cotton fields that were infested last fall is evidence that the pink bollworm may not have survived the winter of 1937-38 in the vicinity of Balmorhea. Weather records indicate comparatively mild temperatures last winter, but cultural practices may have helped to destroy the overwintering larvae in the soil and on the surface. Many fields were heavily pastured with cattle following the final picking. This greatly reduced the surface population of pink bollworms. Conditions were unfavorable for these field examinations for pink bollworms during July, as there was an extremely heavy infestation of *Heliothis obsoleta*, and the cotton square borer (*Strymon melinus* (Hbn.)) and the cotton leafworm (*Alabama argillacea* (Hbn.)) were also abundant in the cotton throughout the valley.

Pink bollworm parasites.--L. W. Noble and S. W. Luke, of the Presidio laboratory, report that none of the introduced species of pink bollworm parasites were recovered from collections made in June, except possibly the Hawaiian strain of *Microbracon mellitor* Say. Less than 2 percent of the pink bollworms were parasitized. *M. mellitor* was the most abundant parasite but it is not known whether these were of the Hawaiian strain or the native strain. *M. platynotae* (Cush.), and another species thought to be *Perisierola* sp. were the other parasites reared.

Sulphur interferes with breeding pink bollworm egg parasite.--L. W. Noble and S. W. Luke, Presidio, report that the breeding of *Chelonus blackburni* Cameron in large numbers was seriously interrupted during the spring because the longevity of the adults and the period of oviposition was reduced. It was feared that the stock of these parasites might die out; however, when the cages were covered with new cloth, the longevity and oviposition again became normal. It was found that the old cloth cage covers contained small quantities of sulphur, which had settled on the cloth when the breeding room had been dusted to control mites. The sulphur present was not sufficient to kill the adults immediately, but was enough to shorten their lives and greatly reduce oviposition.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection of the 1938 cotton crop was begun in the lower Rio Grande Valley of Texas and of Mexico about the middle of July. There has been practically no rain during the harvesting season and cotton is brought to the gins especially clean, so that there is a very small output of trash. This makes for more efficient inspection. Specimens of the pink bollworm were found in large numbers in the first samples of trash inspected at Matamoros, Mexico. During the first 4½ days' operation, 173 bushels of trash were inspected and 3,439 pink bollworms found, or about 19 worms per bushel. This is a much heavier infestation than was present in the 1937 crop. Specimens of the pink bollworm were also found on the Texas side and, while there has been an increase in infestation, it is nothing like as heavy as on the Mexican side. By the end of July 324 specimens of the pink bollworm had been found on the Texas side, most of which came from Cameron County, with a few from Hidalgo and Willacy Counties. Results in Starr County were negative. On the Mexican side 11,158 specimens of the pink bollworm were found at Matamoros and 9 at Reynosa, about 60 miles up the river from Matamoros.

New infestation.--As inspections were completed in the lower Rio Grande Valley machines were moved to counties farther north. Toward the close of the month a pink bollworm was found in Kleberg County, this being the first specimen ever found in that section. Specimens have since been found in Brooks, Jim Wells, and Nueces Counties. Only a few worms have been found, indicating that the infestation is very light. The State of Texas has issued an emergency proclamation placing these four counties in the regulated area, and all cotton products are being moved in accordance with regulations of the pink bollworm quarantine. It is of interest to note that the people connected with the cotton industry were somewhat familiar with pink bollworm regulations, as they have been enforced in the lower Rio Grande Valley for several years. There has been considerable activity looking toward the destruction of cotton stalks. A committeeman from each county has been appointed, and this person will in turn select a larger committee in his county to assist with the stalk-destruction program.

Harvesting of the new cotton crop.--The entire month of July was very hot and dry in the lower Rio Grande Valley of Texas. As a result, the cotton crop matured rapidly and harvesting is fully 3 weeks ahead of last season. Cotton pickers were plentiful, and indications are that ginning will be practically completed within another month. This is the only district in the regulated area in which there has been any ginning, and very little is expected to take place in other districts for another month.

Vehicular inspection.--The vehicular-inspection station on the principal highway leading out of the lower Rio Grande Valley has been operated on a 24-hour basis throughout the month. A total of 15,662 cars were inspected and 967 confiscations made. The confiscations consisted largely of small lots of seed cotton taken from pick sacks. Toward the end of the month unusually large numbers of pickers began moving to up-State points. An inspector has been on duty patrolling roads in Starr County and only one confiscation was made, but considerable educational work was done by contacting farmers living near the quarantine line and advising them about the movement of products.

Thurberia-plant eradication.--The eradication of Thurberia plants has been carried on in the Santa Catalina Mountains of southern Arizona throughout July. During the month 4,160 acres were covered and 34,416 Thurberia plants destroyed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Correction.--In the News Letter for October 1937 (vol. IV, no. 12) lines 11 and 12 on page 21 should read "a rotenone content of 0.0056 percent was as effective as one with 0.0112 (instead of 0.0012) percent rotenone content."

Economic status of strawberry weevil on the Eastern Shore.--According to the results of a survey conducted in May by C. F. Stahl and L. B. Reed, of the Sanford, Fla., laboratory, *Anthonomus signatus* Say caused considerable injury to strawberry plants in the Eastern Shore section of Maryland and in the adjoining counties of Delaware and Virginia. It was found that in the different fields examined from 16 to 81 percent of the strawberry buds were cut by the strawberry weevil on five farms examined in Sussex County, Del. Likewise, a range of from 17 to 67 percent of the buds were cut in three counties examined in Maryland, and from 3 to 63 percent of the buds were cut in Accomac County, Va. In many fields the prevalence of drought and other factors prevented the strawberry plants from developing the remaining uncut buds and it was therefore very difficult to determine whether or not the injury caused by the strawberry weevil resulted in reductions in yield. In several fields, however, the damage caused by this pest was very pronounced.

Tobacco webworm controlled by dipping tobacco plants in cryolite solution containing sticker.--L. B. Scott, of the Clarksville, Tenn., laboratory, reports that when tobacco plants were dipped prior to transplanting, in a mixture containing a sufficient quantity of 85-percent cryolite to provide 1.9 percent of sodium fluoaluminate, combined with a sticker, the treatment was effective in reducing the injury caused by *Crambus caliginosellus* Clem. approximately 90 to 100 percent. Fish oil and mineral oil, each at the rate of 1.6 percent, animal glue at the rate of 0.37 percent, and bill-poster paste at the rate of 0.75 percent were equally effective as sticking agents. Cryolite without a sticker was nearly as effective as the combinations containing these adhesives. The evidence from these experiments thus far indicates that the dipping of tobacco plants constitutes a more effective control of the tobacco webworm than the bait consisting of corn meal with paris green and oil of mirbane, commonly used in combating these pests.

Sugar beet wireworm adults prefer red clover to alfalfa for egg deposition.--Experiments by F. H. Shirck, of the Parma, Idaho, laboratory, demonstrated that at least under cage conditions the adults of Limonius californicus (Mann.) prefer red clover to alfalfa for the deposition of their eggs. In the course of the experiments several hundred L. californicus beetles of both sexes were confined in cages in which red clover and alfalfa plants were growing. An examination of samples of soil in 1/16-square-foot areas to a depth of 4 inches taken immediately surrounding the red clover and alfalfa plants showed that of a total of 803 L. californicus eggs found in the soil samples, approximately 68.9 percent were found immediately adjacent to the red clover plants and the remaining 31.1 percent were found immediately adjacent to the alfalfa plants. Similar soil samples taken in the bare spaces between the plants revealed only a few L. californicus eggs. This preference for red clover for the deposition of eggs may explain the tendency of red clover fields to become more heavily infested with wireworms than fields planted to other crops.

Insecticide tests against cabbage worms.--An analysis of the data obtained by W. J. Reid and C. O. Bare, of the Charleston, S. C., laboratory, in insecticide tests directed against the more important species of cabbage worms attacking the spring cabbage crop in that section indicated that a highly significant correlation existed between the numbers of each of the three species of worms present, i. e., the cabbage looper, the imported cabbage worm, and the diamond-back moth, and the number of cabbages produced of U. S. Grade No. 1, as well as the number of worm-damaged plants. As the numbers of worms were decreased by the treatments there was a corresponding increase in the number of U. S. Grade No. 1 plants produced and a corresponding decrease in the number of plants ineligible for that grade because of worm damage. Highly significant differences were demonstrated between worm populations and yields resulting from the use of the various insecticide materials and the intervals of application. Materials used in these tests consisted of dust mixtures containing 0.5 percent rotenone, 1.0 percent rotenone, and 0.3 percent total pyrethrins, respectively, as well as a combination dust mixture containing 0.5 percent rotenone plus 0.2 percent total pyrethrins. Applications of the insecticides began when the combined worm populations reached 96.9 worms per 100 plants. Applications were made at 7-, 10- to 11-, and 14-day intervals, respectively. Against the cabbage looper the 1.0-percent-rotenone and the derris-pyrethrum dust mixture at 7-day intervals between applications were most effective; against the diamond-back moth the 1-percent rotenone and the derris-pyrethrum dust and the 7- or 10- to 11-day intervals were most effective; against the imported cabbage worm the 0.5-percent rotenone, the 1.0 percent-rotenone, and the derris-pyrethrum dust were significantly different and were significantly superior to the pyrethrum. Against this species the 7- and the 10- to 11-day intervals were superior to the 14-day interval. In general, the results indicated that, under the conditions of the experiment, the 0.5-percent-rotenone dust mixture used at intervals of either 7 or 10-11 days was the most efficient of the treatments tested, both from the standpoint of production of U. S. Grade No. 1 cabbage and of costs. It was apparent, however, that under conditions of greater population of the cabbage looper and of less ideal dusting conditions a 1-percent-rotenone dust applied at approximately 7-day intervals would be preferable.

How tomato fruitworm larvae get poison from insecticides.--During the course of experiments with Heliothis obsoleta F., at the Alhambra, Calif., laboratory, Joseph Wilcox and Arnold Mallis observed that the first instar of H. obsoleta cleaned its feet with its mandibles. Further observations made on the larger larvae confined in petri dishes that had been dusted with corn flour showed that not only the forelegs but also the middle legs were cleaned by the mandibles, that the larvae ate particles of the material from the leaf surface in the petri dishes, and that the forelegs were used to assist in this feeding. A continuation of these experiments on tomato plants revealed the fact that the larvae followed substantially the same practice as was indicated in the petri dishes. The results of these observations indicate that H. obsoleta larvae can be killed on the plants from the effects of insecticide applications without actually consuming any of the plant upon which the insecticides are applied.

Derris controls a plant bug on lettuce grown for seed.--K. B. McKinney, of the Phoenix, Ariz., laboratory, reports that preliminary cage tests have indicated that a derris dust mixture containing 1 percent rotenone with clay as a diluent was effective in controlling the adults of the plant bug Corizus hyalinus F., which has been causing considerable damage to lettuce grown for seed in the Salt River Valley of Arizona and in the Yuma Valley. This dust mixture, however, was not as effective against the C. hyalinus nymphs as it was against the adults.

Relative effectiveness of different insecticides against Mexican bean beetle.--The results of an experiment conducted at Norfolk, Va., by L. W. Brannon, against Epilachna varivestis Muls. on the spring crop of snap beans, in order to determine the relative effectiveness of derris, cube, and cryolite dusts and sprays, showed that, based on the degree of foliage injury, derris and cube sprays containing 0.015 percent rotenone and dust mixtures containing 0.5 percent rotenone are the most effective materials yet devised for the control of the Mexican bean beetle. Sprays containing cryolite (3 pounds to 50 gallons) and cryolite dust mixtures containing 60 percent of the former and 40 percent of talc, by weight, were more effective in the control of the insect than in 1937 or 1936. Sprays containing 3 pounds of phenothiazine to 50 gallons of water, with 2½ ounces of sodium lauryl sulphate, gave good control of the bean beetle. The cryolite dust mixtures were not so effective as the cryolite sprays. Dust mixtures containing combinations of derris, pyrethrum, and sulphur were equally as effective as derris-talc or cube-talc dust mixtures containing the same percentage of rotenone. Of the three brands of cryolite used in the dust mixtures employed in these tests, the natural cryolite and the domestic synthetic cryolite were slightly more effective than the imported synthetic cryolite.

INSECTS AFFECTING MAN AND ANIMALS

Field laboratory established at Nice, Calif.--A new field laboratory of this Division has been established at Nice, Calif., for the purpose of investigating the biology and methods of control of the Clear Lake gnat (Chaoborus lacustris Freeborn), a nonbiting midge which breeds in enormous numbers in Clear Lake. A. W. Lindquist, associate entomologist, has been placed in charge.

Large numbers of rabbits killed by motorists.--D. C. Parman, of the Uvalde, Tex., laboratory, reports that the highway between Fort Stockton and McCamey, Tex., was literally covered during July with the carcasses of Jack rabbits that had been killed by automobiles, there sometimes being 100 or more dead animals per mile. These carcasses are probably breeding enormous numbers of blowflies.

Parasites released for control of American dog tick.--During the spring and summer of this year C. N. Smith, of the Vineyard Haven, Mass., laboratory, has released about 40,000 specimens of *Hunterellus hookeri* How., parasitic on the nymphal stage of *Dermacentor variabilis* (Say), to determine whether the parasite will be able to survive in that locality and to test the feasibility of this natural control over fairly large areas.

Freeing vegetation of ticks.--Results of preliminary tests made by Mr. Smith on methods of ridding vegetation of ticks have shown that nicotine sulphate (1-200) will keep vegetation free of ticks for approximately 72 hours, and that creosote oil, kerosene extract of pyrethrum, and aqueous solutions of pyrethrum are effective for 24 hours.

Effect of synergized sprays on housefly.--Craig Eagleson, of the Dallas, Tex., laboratory, reports that in a preliminary test with *Musca domestica* L. in a closed barn a somewhat longer time was required to produce torpor with a spray of 50 mg pyrethrins per 100 cc, plus 10 percent synergist oil than with 100 mg pyrethrins per 100 cc sprays, but flies collected 15 minutes after spraying failed to revive under favorable conditions. The reduction of pyrethrin content of synergized sprays to 50 mg per 100 cc reduces the efficacy of the spray in open dairy barns.

FOREIGN PLANT QUARANTINES

Insects collected in Guam.--The following insects were collected by R. G. Oakley from November 1937 to May 1938 in the field in Guam: *Aiolopus tamulus* (F.) on rice, *Anomala sulcatula* Burm. on lemon leaves, *Clovia eugeniae* Stal on leaves of *Morinda citrifolia*, *Carias fabia* (Stoll.) in okra pods, *Engytatus tenuis* (Reut.) on tobacco, *Etiella zinckenella* (Treit) (lima bean pod borer) in string bean pods, *Eutochia lateralis* Boh. on decaying grass, *Heliothis obsoleta* (F.) in tomato, *Holotrichia mindanaona* Brenske on banana leaves and in soil, *Leptocorisa acuta* (Thunb.) on rice, *Limnogonus fossarum* (F.) in water in rice field, *Megamelus proserpina* Kirk. on leaves and stems of native taro, *Prodenia litura* (F.) on leaves of *Iponoea* sp., *Pyrausta nubilalis* (Hbn.) in cornstalk, *Scholastes bimaculatus* Hend. in decaying coconut pulp, *Selenothrips rubrocinctus* (Giard) (red-banded thrips) on leaves of *Bixa orellana*, and *Tiracola plagiata* (Wlk.) on leaves of *Iponoea* sp.

Interceptions at the Washington, D. C., Inspection House.--Owing to the intensive inspection given special permit and mail material at the Inspection House a great many interceptions are made in proportion to the quantity of material handled. Some of the more interesting of these interceptions which have not received notice in the News Letter during the past year are listed here. *Anguina tritici* (Steinb.) Filipjev was intercepted in 10 lots of wheat from Afghanistan on December 17, 1937, and in 11 lots from the same country on February 23, 1938. Bunt (*Tilletia laevis* Kuehn) was found on a number of these lots of wheat. Although both diseases are present in this country, there is always danger of introducing new strains from countries from which importation is unusual. *Diplodia viticola* Desm. was intercepted on *Vitis* sp. from Afghanistan on January 29. *Ditylenchus dipsaci* (de Man) Filipjev was found in a lupine from Holland on November 18, 1937. *Hemileia oncidii* Griff. and Maubl. was intercepted on orchids from Brazil on May 4 and again, on two lots, on June 3, 1938. *Hendersonia packii* Clinton was intercepted on *Lonicera tatarica* from Sweden on February 18. *Heterodera marioni* (Cornu) Goodey was intercepted in *Anemone tessiri* from Germany February 7, in begonia from Jamaica on June 22, in *Coptis quinquefolia* from Japan on December 22, in *Convolvulus incanus* from England on April 25, in *Melocactus matanzanus* from Cuba on November 23, in *Pachysandra terminalis* and *Sarcocca ruscifolia* from England on March 7, and in *Viburnum glomeratum* from Austria on April 5. *Leptothyrium castanea* (Spreng.) Sacc. was found on oak leaves from England on March 11 and *L. macrothecium* Fckl. on two lots of peonies from Japan on November 30. *Rhabdospora ramealis* Sacc. was intercepted on *Rubus* sp. from England on February 28.

Entomological interceptions of interest.--Two larvae of the trypetid *Anastrepha mombinpraeoptans* Sein were intercepted at El Paso, Tex., on July 5, in a mango fruit in baggage from Mexico. An adult and pupa, both living, of the Mediterranean fruitfly (*Ceratitis capitata* Wied.) were intercepted at Baltimore, Md., on November 6, 1937, in quince in the mail from Italy. A living larva of the pink bollworm (*Pectinophora gossypiella* Saund.) was taken at New York on June 13 in seed cotton in baggage from Uganda, East Africa. Ten living larvae of the Asiatic rice borer (*Chilo simplex* Butler) arrived at Seattle, Wash., on May 20 in rice straw in cargo from Manchuria. The rice straw was used as packing material for household goods. One living and eight dead adults of *Bruchus atomarius* L. were found at Philadelphia on May 2 in seeds of the flat pea (*Lathyrus sylvestris* var. *wagneri*) in the mail from Germany. Sixteen living adults of *Callosobruchus ademptus* (Sharp) were taken at Chicago, Ill., on May 3 in kudzu-bean (*Pueraria thunbergiana*) in the mail from the Netherlands. Living specimens of the mango weevil (*Sternochetus mangiferae* F.) were intercepted at San Pedro, Calif., on July 4 in mango seeds in ship's stores from the Philippines. A living specimen of the acridid *Taeniopoda auricornis* (Walk.) arrived at Laredo, Tex., on June 21 on bananas in cargo from Mexico. Living specimens of the pentatomids *Edessa cornuta* Burm. and *Mormidea cubrosa* (Dall.) were intercepted at Nogales, Ariz., on June 9 on orchid plants in baggage from Mexico. Living specimens of the scale insect *Aspidiotus latastei* Ckll. were found at Washington, D. C., on June 3 on an orchid in express from Brazil. This species is not known to occur in the United States. A living adult of the weevil *Metamasiopsis decempunctatus* Champ. was intercepted at San Francisco on March 1 in a plant (Bromeliaceae) in express from Mexico. This is new to the National Museum Collection.

Pathological interceptions of interest.--*Aphelenchoides fragariae* (Ritzema Bos) Christie was intercepted in begonia leaves from Yugoslavia on August 2 at New York. *Cronartium ribicola* Fisch. was intercepted on July 26 at New York on leaves of *Ribes* sp. from Germany. *Ditylenchus intermedius* (de Man) Filipjev was intercepted in *Dioscorea* sp. tubers from Puerto Rico on June 20 at New York. *Macrophoma candollei* (B. & Br.) Berl and Vogl. was intercepted on leaves of Buxus sempervirens used as packing for rosebuds in baggage from France on August 2 at New York. Phyllachora acaciae Henn. was intercepted on Acacia farnesiana from Mexico on July 4 at Brownsville. Ramularia cynarae Sacc. was found at Philadelphia on July 16 on globe artichokes from Italy. Rotylenchus bradys (Steiner and Le Hew) Filipjev was intercepted in Dioscorea sp. tubers from Puerto Rico on June 6 and June 20 at New York. Septoria betae Westd. was intercepted on July 13 at El Paso on chard leaves from Mexico. A severe spotting of lemon from Italy was referred to specialists in the Bureau of Plant Industry, who reported that S. limonum Pass. appeared to approach the specimen most nearly. S. pastinacae West. was found on parsnip leaves from Denmark on July 7 at Boston.

DOMESTIC PLANT QUARANTINES

Grasshopper baiting effects control.--Effective baiting for grasshoppers had given a high degree of control throughout the infested regions at the close of July. In areas where idle lands greatly predominated, the baiting was effective until dry weather forced hordes of the hoppers into the crops. In the Rocky Mountain area infestations of species other than Dissosteira longipennis Thos. were largely localized on irrigated lands and good control was obtained for different crops, with unusually high savings of alfalfa.

Prolonged grasshopper hatch necessitates repeated baiting.--In Mississippi Valley areas localized outbreaks have resulted from short periods of favorable hatching weather. Repeated baiting has accomplished a high degree of control and is continued for the prolonged hatch, as well as the normally late species of grasshoppers.

Grasshopper situation in the Dakotas, Wyoming, and Montana.--Enormous populations of Melanoplus mexicanus Sauss. developed in the current season on idle lands in western parts of the Dakotas and eastern areas of Wyoming and Montana, making it physically impossible for the farmers to bait the extensive areas with available man power. Crops and range lands carried populations of from 10 to 30 per square yard, and field margins and roadsides populations up to 60. General migrations of adults in July are attributed to build-up populations in past years, a long egg-laying season in 1937, favorable hatching conditions in 1938, and abundant succulent vegetation in the present season. In brief dry periods the hoppers migrated to the crops. Some protection was obtained by repeated baiting of adjacent lands.

Migratory grasshoppers controlled.--Concerning activities in the migratory grasshopper area, W. E. Dove, field project leader, writes: "The southeastern section of Colorado, the northeastern section of New Mexico, and the Panhandle counties of Texas bordering New Mexico have kept up an efficient bombardment and superiority of fire through bait-spreading operations which remind one of real warfare. National Guard trucks, as well as trucks from all agencies interested in agriculture, were found hauling bait materials or mixed bait, while smaller trucks and passenger cars pulled bait spreaders in line formation to cover these extensive acreages. This work called for funds from every available source and civic clubs, dances, popular subscriptions, and other sources were used in supplying the necessary funds for local needs. * * * A high degree of control was obtained for this species (Dissosteira longipennis Thos.) in all three States."

Mormon cricket control work closing.--Dusting operations, which have been carried on in the current season throughout the infested States, are approaching completion and preparations are being made for the adult and egg surveys. Men and supplies are kept available, however, for immediate use in case further migrations threaten crops. Very satisfactory control has been reported from most of the areas. By the close of the month arrangements were being made for collecting and storing dusting materials, metal barriers, and equipment remaining in the field at the close of the season.

Observations on Mormon crickets.--Crickets in Crooks County, Wyo., apparently dying from infestations of red mites, were found in most cases to contain unusual water sacs in the fore abdominal cavity above the crop. When the body of a cricket was opened the sacs protruded like a pair of wings. Concerning range injury on experimental plots in Nevada, it is reported that "much bluegrass which was cropped close to the ground by crickets early in the season will never recover. A lone cottonwood at Indian Springs was observed to be partially defoliated. Injury to sagebrush was noted and crickets were observed feeding on the flowers of Asclepias and Helianthus, as well as on oats and wheat. Alfalfa, potatoes, watermelons, onions, peas, and sweet corn were observed to be damaged by cricket feeding." Favorite places for Mormon crickets to deposit their eggs, according to observations in Utah, are rocky south slopes of hills, also hard roadbeds.

More white-fringed beetle infestations.--White-fringed beetles have recently been found on several properties in Bolton, Hinds County, Miss. (about 150 miles north-northwest of Gulfport), representing the most northerly infestation located thus far. An area of approximately 200 acres is known to be infested and the limits are not yet determined. Owing to proximity of the infestation to the Mississippi Delta, immediate action was taken to start dusting operations and to insure the cleaning up of railroad yards and other industrial premises, the owners cooperating fully. An infestation was also located in Pearl River County, in southern Mississippi. The well-developed inspection activities now under way in the State include both a survey campaign throughout the State, assisted by public-spirited organizations and citizens, and a systematized inspection on the part of Federal and State inspectors. Similar work is carried on in other known infested States and spot inspections are being made in Georgia, Texas, Tennessee, and South Carolina.

White-fringed beetle emergence.--The peak of emergence of white-fringed beetles at Florala, Ala., occurred July 12-20, whereas the maximum emergence over the known infested areas was reported as July 10-25.

White-fringed beetle control.--Spraying of railroad rights-of-way with oil emulsion was continued in July at Pensacola, Fla., and Florala and Lockhart, Ala., effecting on some areas a 50-percent kill of beetles and destroying their food plants. Calcium arsenate dust was applied to areas in New Orleans, La., Gulfport and Laurel, Miss., and Glendale, Fla. Cultivated fields in Alabama and Florida were redisked. Barrier furrows were constructed around infested areas at Laurel, Miss., and the boundary vegetation dusted. Measures were taken to reduce beetle populations at

Gulfport, Saucier, McHenry, and Landon, Miss., as well as precautions to prevent their spread through the movement of army troops encamping in southern Mississippi. Immediate control measures were applied to city blocks in Pensacola and to places in New Orleans from which spread would be most likely, such as shipping centers, tourist camps, docks, and vacant lots near nurseries.

Peach mosaic inspection.--During July inspection for the peach mosaic disease was made jointly with the States of Arizona, California, Colorado, Idaho, New Mexico, Oklahoma, Texas, and Utah. No mosaic disease has been found in Idaho. All diseased trees are being removed at the time of inspection in Colorado, Utah, and Oklahoma. The removal of diseased and abandoned trees throughout the infected States is under way with the services of 161 relief employees. The interest of cooperating States, counties, and growers is demonstrated in the fact that a greater percentage of the infected trees was removed to the close of June 1938 than in the same period in 1937. The environs of nurseries and budwood sites are thoroughly inspected for a radius of 1 mile, as provided in standardized State quarantines, and an inventory of the nurseries that failed to meet the quarantine requirements is being kept. It is believed that this will materially reduce the possibilities of artificial spread.

Nursery inspection for phony peach disease.--The environs of 638 nurseries in over 200 counties in 13 States have been inspected in the current field season and all of the 1,829 phony trees found in the 1-mile radius of such nurseries were removed prior to June 30, the deadline date prescribed in quarantines of several States. This is the first time in the history of the project that removal of every diseased tree has been accomplished by that date. The inspection covered 1,500,000 trees on 11,000 properties. Similar work is under way in States whose quarantines provide for removal of diseased trees at a later date.

Phony peach disease reduced.--In addition to work in the vicinities of nurseries, inspection is under way on all properties found infected since 1929 in the lightly infected States and since 1935 in those more generally infected. Results thus far show a decided reduction in the disease, as compared with previous years. Ultimate eradication of the phony peach disease is considered entirely possible.

Sweetpotato weevil control for the past year.--A summary of the activities for control of the sweetpotato weevil since the project was authorized by Congress on July 1, 1937, prepared by the field project leader, T. R. Stephens, shows that surveys have been made in 172 counties of Alabama, Georgia, Louisiana, Mississippi, and Texas, for the purpose of determining the northern boundary of the infestations, and the areas where eradication would be carried on. Thirty-three counties were found infested, with property infestations of 2,555. The surveys included inspections of seedbeds, field, storage, and wild host plants. Volunteer sweetpotato plants and wild hosts have been destroyed on known infested properties and those adjacent. Infested fields, storage banks, and seedbeds have been cleaned up and growers assisted in sanitation practices. The use of 59,000 sweetpotatoes as traps in cleaned fields captured 24,000 weevils. Alabama and Georgia sponsored W. P. A. projects on the eradication work. A uniform State quarantine standardizing the regulatory and control work was adopted by the States. Work has been carried on jointly with the affected States to whose generous contributions is attributed a large part of the success attained thus far in the control of the weevil.

Citrus canker eradication.--Work in June was confined to the Texas counties of Brazoria, Hardin, Harris, and Jefferson, with thorough inspection in the city of Houston, where several old locations of trifoliates were found. In cooperation with the State, 829 properties were inspected during the month and 120,000 host trees destroyed, including escaped and uncultivated trees and several thousand abandoned nursery trees in Hardin County. Canker was found in Harris County on six citrus seedlings on a formerly infected property. They had just come up from seed balls apparently 3 years old. A second round of sterilization of infected properties with pear burners in Brazoria County, where incipient infections have been recurring since 1935 from old canker areas, failed to show any indications of the disease. All the work was carried on in the noncommercial citrus areas.

Dopson reassigned to citrus canker project.--R. N. Dopson was again placed in charge of the citrus canker eradication project on July 16, with headquarters at Houston, Tex., inasmuch as the services of W. R. Heard, who has been in charge of the project since last March, are needed on white-fringed beetle control.

Live Japanese beetles in railway cars.--Twenty-one live Japanese beetles had been found up to the close of July at transit-inspection points in the Midwest, in cars of produce arriving from the heavily infested areas. The number of produce cars from the East is less than half the usual movement, the Chicago inspectors report, as growing conditions in the Midwest have been excellent this year.

Nursery-stock shipping season is good.--Movement of nursery stock throughout the Central States was unusually good during the last spring and fall shipping seasons, while the percentage of violations on the part of commercial shippers showed a decided decrease, according to the report of the Chicago office for the last fiscal year. Of the 500,000 shipments inspected at central and southern points, it is reported that 1,264 were in violation of Federal quarantines, and many others represented infringements of State pest-control regulations. States have cooperated through the assignment of inspectors to assist in the project.

More forest-plant products observed in transit.--Several New England establishments which ship such products of forest trees as wood shavings, sawdust, cross ties, and slabs, have recently been placed on the "current inspection list" for gypsy moth inspection at origin, as a result of information supplied by transit inspectors at Boston as to the interstate movement of such products.

Assistance in Japanese beetle trapping.--Inspectors of the Division of Domestic Plant Quarantines have cooperated with the Japanese beetle control project during the current season by placing and tending traps for the beetles at 10 points in the South and West where such inspectors are stationed.

CONTROL INVESTIGATIONS

Colorado potato beetle inactive during summer months.--High summer temperatures are almost as important as low winter temperatures in causing dormancy of the Colorado potato beetle at Sanford, Fla. M. C. Swingle, of the Sanford laboratory, reports that in laboratory rearing of the species most of the adults entered the soil in May and June, although a small percentage, almost 10 weeks old, are still crawling about in the cages. These adults oviposit very rarely, and feeding is definitely less than under optimum conditions. Periodic exposure of the dormant adults to low temperature in the refrigerator has arrested the dormant period in a few tests, but the adults do not oviposit nor feed normally at the high room temperature. It appears probable that the dormant adults become active late in the fall, in contrast to their behavior in the Northern States.

INSECTICIDE INVESTIGATIONS

Structure of pyrethrins.--The structure of pyrethrin I and pyrethrin II, the active principles of pyrethrum flowers, has not been fully elucidated. F. B. LaForge and H. L. Haller have just published their twelfth contribution to the study of this problem (Jour. Organ. Chem., vol. 2, no. 6, pp. 546-559, January 1938). Their conclusion is that the formula proposed in 1924 by Staudinger and Ruzicka is not correct.

Determination of small quantities of methyl bromide in air.--The work of this Bureau has shown that methyl bromide is an effective fumigant for several insects infesting vegetable products and that it does not injure green vegetables. Methyl bromide is now being used on a large scale for the fumigation of potatoes in railroad cars. In the studies of this material as a fumigant it is important that the exact concentration in the space being fumigated be known. A method for determining small quantities of methyl bromide in air has just been published by R. L. Busbey and N. L. Drake of this Division (Indus. Engin. Chem., Anal. Ed. vol. 10, no. 7, pp. 390-392, July 15, 1938). The method consists in saponifying the methyl bromide by alcoholic potassium hydroxide, removal of the alcohol, oxidation of the bromide to bromate by sodium hypochlorite, and iodometric titration of the bromate.

Codling moth studies.--J. E. Fahey and H. W. Rusk, in cooperation with L. F. Steiner and R. F. Sazama of the Division of Fruit Insect Investigations, have been studying the larvicidal efficiency of various sprays as affected by the factors of growth, rainfall, and time of application. It was found that the surface area of the apples doubled during the week after the first cover spray and increased five times in the first 4 weeks. A report of these studies is published in the Transactions of the Indiana Horticultural Society for the Year 1937 (pp. 88-89).

Compounds of peat with alkaloids.--L. N. Markwood on July 12, 1938, was granted U. S. Patent 2,123,248, which covers the substantially water-insoluble reaction products of peat with organic bases of the group consisting of arecoline, anabasine, codeine, ethylene diamine, and piperidine. One of the objects of this invention is to provide means for rendering these bases less soluble in water, the free bases themselves being soluble. Their

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usefulness and application are thus increased, as in the field of veterinary medicine where they offer possibilities in the control of internal parasites, when administered in a substantially insoluble form.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

An important lepidopterous insect from Guam.--Moths, larvae, and pupae reared from string beans on the island of Guam and submitted by R. G. Oakley, of the Division of Foreign Plant Quarantines, have been identified by Carl Heinrich as *Cryptophlebia carpophaga* Walsingham (family Olethreutidae). There are other specimens of this species in the National Collection from India, Guam, and China. It is apparently widely distributed in the Indo-Malayan region and has been reared from *Parkinsonia* and *Bauhinia* pods, fruits of *Aegle marmelos*, litchi seeds, and pods of *Cassia fistula* and several species of *Acacia*. The record from string beans is apparently new. *C. carpophaga* has been listed as a synonym of *illepida* Butler (described from Hawaii) and under the latter name has figured frequently in economic literature. The synonymy, however, is very doubtful.

The range of Anastrepha species Y extended.--A single specimen of this striking species that has been trapped so frequently in the lower Rio Grande Valley and at the Hacienda Santa Engracia, Tamaulipas, has been sent in from Panama by James Zetek. This was trapped on June 15, 1938, at La Campana, Panama, associated with 13 other species, 5 of which are undescribed. As a result of this record, Alan Stone states that there are now only two species of *Anastrepha*--*A. ludens* and *A. pallens*--that occur in the Rio Grande Valley but do not occur in Panama or farther south.

Ants attacking screwworm flies.--The Division of Insects Affecting Man and Animals submitted for determination ants collected on July 8, 1938, at Menard, Tex., by Roy Melvin, who reported that they were attacking newly emerged adults of the primary screwworm (*Cochliomyia americana* C. and P.). The ants were determined by M. R. Smith as *Eciton (Labidus) caecum* (Latr.). Mr. Melvin stated that the ants attacked the flies as they emerged from buckets of sand placed 25 feet deep in an old well.

New host record for an aphid.--Specimens of an aphid taken at quarantine on turnips from the Netherlands (Norfolk No. 4066) were determined by P. W. Mason as *Rhopalosiphoninus tulipaella* (Theob.). This species is usually found on bulbous floral plants such as tulips, *Iris*, *Gladiolus*, and *Muscari*. The National Collection contains one lot taken on beets from Holland in 1932.

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